

A	4	5	13	7
M	12	7	19	5
J	15	5	23	7
J	20	7	26	8
A	35	15	47	23
S	57	27	67	44
O	62	35	68	41
N	47	17	55	24
D	35	2	37	9

Table 3: Major families represented.

Families	Species	Natives	Naturalised
Asteraceae	18	8	10
Epacridaceae	7	7	0
Liliaceae	18	18	0
Myrtaceae	11	11	1
Papilionaceae	20	13	7
Poaceae	20	2	18
Proteaceae	8	8	0
Stylidiaceae	7	7	0

## BIRDS BENEFIT FROM PROFESSIONAL FISHING AT MANDURAH, W.A.

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### INTRODUCTION

It is generally known that birds attend fishing boats and scavenge offal and unwanted fish from them, but precise details are lacking and nothing has been published locally. Hence this paper reports some observations which were made at Mandurah in the early 1970's during professional fishing operations, mostly in Peel Inlet.

Professional fishermen are prohibited by law from catching or marketing fish below a certain size. However undersized fish are sometimes caught during legitimate fishing operations, and, along with non-commercial species, are only cleared from the nets at the fishermen's convenience. Most of these fish are dead or near dead when taken from the nets and are normally discarded. Thus they are easy prey and a big attraction to fish-eating birds.

### OBSERVATIONS AT MANDURAH

Pelican *Pelecanus conspicillatus*. Small numbers sometimes congregate alongside the fishermen's submerged nets, removing commercially valuable fish and often damaging the nets. Also when fishermen clear their nets, usually in shallow water close to shore, groups of Pelicans will gather around the boats and readily take most species of fish discarded. They will also try to take fish from inside the boats and have to be discouraged.

Marketable fish such as mullet *Mugil* and *Aldrichetta* spp., Herring *Arripis gorgianus* and whiting *Sillago* and *Sillaginodes* spp. and non-marketable fish such as Trumpeter *Pelates sexlineatus* and Perth Herring *Nematalosa vlaminghi* are eagerly seized, quickly manipulated into position in the bird's beak, and immediately swallowed. However the Leatherjacket *Monacanthus chinensis* is

treated more cautiously because of its tough skin and a barbed spike which can be erected at right angles to its body. This fish is frequently tossed, turned around, and carefully mashed in the bird's beak before being swallowed. It is common for the birds' pouches to be punctured and torn by the barbs.

Surprisingly even the Devil Fish *Gymnapistes marmoratus* which has an array of venomous spines in its fins will be seized when dead or near dead by a Pelican and, after a considerable amount of manipulation and mashing, will eventually be swallowed.

The Blowfish *Torquigener pleurogramma* is never eaten, the bird losing interest in the fish after visual recognition. Infrequently a bird will pick up a Blowfish in the tip of its beak, give it a cursory examination, and then reject it.

Pied Cormorant *Phalacrocorax varius*. This cormorant ravages nets in the Mandurah estuaries. It is common for the birds to congregate alongside the nets and take commercially valuable fish such as the King George Whiting *Sillaginodes punctata*. These cormorants fully realise the significance of a net being run out and will take up positions along it even before any fish have been meshed. Although it has become bolder and is now a significant pest, fishermen mostly tolerate this cormorant around the boats when the fish are being cleared from the nets. It actively competes with other birds for the fish that are being discarded; however, in the deeper waters of the estuary it is almost the sole contender for fish which sink to the bottom.

The only other competition comes from the Great Cormorant *Phalacrocorax carbo*, a much less aggressive species. Pied Cormorants readily consume most of the fish described for the Pelican but I have never seen them take the Devil Fish or the Blowfish.

Great Cormorant *Phalacrocorax carbo*. This species is less abundant than the Pied Cormorant in the Mandurah estuaries. I have seen it only infrequently at the fishermen's nets. Likewise it seldom attends the boats when the nets are being cleared. However the fishermen claim that during the breeding season of this species it runs a "shuttle service" between the nets and the rookeries. (The Darter *Anhinga nufa*, Little Black Cormorant *Phalacrocorax sulcirostris*, and the Little Pied Cormorant *Phalacrocorax melanoleucos* do not attend the boats or the nets.)

White-faced Heron *Ardea novaehollandiae*. This species benefits slightly from the fishermen's activities. One or two herons may fly out to the unoccupied boats which have been moored for the day and conduct a very thorough search of them. Gulls or terns would readily take any fish in plain view but the herons painstakingly search every nook and cranny.

Silver Gull *Larus novaehollandiae*. Up to 100 birds usually converge on a boat when fish are being discarded, either flying around or floating nearby. Both commercial and non-commercial species of fish are eagerly seized and devoured. However I have never seen gulls take the Leatherjacket or the Devil Fish. Furthermore Silver Gulls will not take Blowfish when other species are available even though observations of mine show that this fish can form a common part of the gull's diet (Stranger 1970).

Experiments conducted by me have revealed that Trumpeter, Herring and Yellow-eyed Mullet *Aldrichetta forsteri* up to 20 cm in length can be carried

and swalled by the gull if it is not harried or disturbed. However, even though a gull can carry a Skipjack *Pseudocaranx dentex* 15 cm in length it is unable to swallow it because of the depth of the fish's body. Furthermore because birds are extensively harried by other gulls, terns, Pelicans and cormorants the larger fish, over 15 cm in length, are usually lost to the Pelicans and cormorants.

Sometimes when a Pied Cormorant is ravaging a net it will surface with a fish in its beak. If the bird does not feel inclined to swallow it immediately, perhaps because it is gorged and cannot, the bird usually comes under attack from the gulls. Frequently the cormorant will shake its head, thereby dislodging the fish, which will be immediately seized by a gull.

Silver Gulls frequently try to take meshed fish from the top of the nets but invariably fail, presumably because the fish are too firmly meshed.

Caspian Tern *Sterna caspia*. This large tern generally remains above the flock of milling gulls and Crested Terns *Sterna bergii* and seldom dives on fish near the boats. It actively harries the Silver Gulls and Crested Terns and often obtains some of the larger fish which they drop. It does not normally seize discarded Blowfish but I have seen it do so under natural conditions, which contradicts my earlier results (Stranger 1970). I was also in error when I said that Silver Gulls and Crested Terns pick up Blowfish with their feet. Those birds, like the Caspian Tern, seize Blowfish with their beaks. Caspian Terns often try to wrest fish from the top of nets but invariably fail.

Crested Tern *Sterna bergii*. This species is the aerial rival of the Silver Gull and readily seizes any of the aforementioned fish except the Leatherjacket, Devil Fish and Blowfish. Very rarely it may seize and swallow a Blowfish, which contradicts my earlier findings (Stranger 1970).

Crested Terns can easily swallow Trumpeter up to 15 cm long and can manage to swallow fish up to 20 cm long. They are extensively harried by other birds and the larger fish are frequently dropped and lost. They never succeed in wresting fish from the nets.

Once when a Crested Tern emerged from a dive to catch a small Skipjack, I noticed that its beak was open, the mandibles having speared the fish about 1 cm apart. It then shook the fish free and secured it in its mouth.

Raven *Corvus coronoides*. This species does not benefit directly but scavenges around the various camps and moorings of the fishermen.

## OCEANIC OBSERVATIONS

Fishing for Whitebait *Hyperlophus vittatus* along the oceanic beaches also provides easy meals for some of the birdlife. During this type of fishing, many hundreds of Whitebait are killed and float freely in the water where they are fed on by Silver Gulls and Crested and Caspian Terns. Wedge-tailed Shearwaters *Puffinus pacificus* will also attend such areas and they can be seen sweeping through the gulls and terns.

During crayfishing operations fish and animal offal is released into the sea and in the deeper waters oceanic birds are attracted to it. The Giant Petrel *Macronectes giganteus*, Yellow-nosed Albatross *Diomedea chlororhynchos*, and the Black-browed Albatross *Diomedea melanophrys* all scavenge the offal and



the Wilson Storm Petrel *Oceanites oceanites* will approach the boats very closely and feed on the smaller particles.

#### REFERENCE

STRANGER, R.H. 1970. Feeding of the Silver Gull *Larus novaehollandiae* on the Blowfish *Spheroides pleurogramma*. *West. Aust. Nat.* 11: 101-110.

### NOTES ON THE STATUS OF THE SKINK LIZARD *CTENOTUS LANCELINI*, ON LANCELIN ISLAND

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Lancelin Island is 9 hectares in area and is situated 110 kilometres north of Perth. It is the only known locality for the skink lizard *Ctenotus lanceolini*. After a recent visit to the island in search of this lizard we decided through this article to highlight problems concerning its conservation.

There are a number of reptiles that are island endemics along the Western Australian coast. Although each is restricted in distribution to the respective island where it occurs the majority are locally common. Several factors contribute to this "locally common" phenomenon. Ford (1963) suggested that the reduction in interspecific competition in lizards on islands has allowed for increased population densities, in particular on small islands where a single species has become dominant. On these, competition is greatly increased due to an overlap of ecological niches resulting in the local extinction of closely allied species. He illustrated this in *Egernia*: *E. kingii* occurred together with 2 smaller congeneric species on large islands but was the only species of *Egernia* on eight small islands. In recent times this isolation minimises pressure from human disturbance such as the destruction of habitat or the introduction of exotic plants and animals.

There are three Western Australian island endemic lizards gazetted "rare and endangered". Two are locally common: *Ctenotus angusticeps* (Browne-Cooper & Maryan 1990) and *Egernia stokesii aethiops* (Storr & Harold 1990). *Ctenotus lanceolini* is the third species listed as endangered. We considered it to be seriously threatened during our assessment on a field trip to the island on 6 October 1991. This was further substantiated during research into its relative abundance in previous years.

We visited the island with the intention of photographing this species. After a 5 hour search we failed to locate a single individual. We assumed conditions for activity to be optimum — a fine spring day with the temperature at 22°C. We did however observe all other skinks known to occur there, i.e. *Ctenotus fallens*, *Cyclodomorphus branchialis*, *Egernia bos* and *Morethia lineocellata*. On 2 previous visits (December 1981 and March 1983) we found it to be reasonably common and located ten individuals on each occasion. Ford (1963) mentioned that between 1959 and 1961 it was not uncommon